

Sedimentary evolution and shale oil potential of Shahejie Formation in Zhanhua sag, Bohai Bay Basin, China

Shang Xu, Yufan Wang, Fang Hao, Huimin Liu, Yuanyin Zhang, Bo Gao, Kelai Xi, and Qiqi Li

AAPG Bulletin, v. 110, no. 2 (February 2026), pp. 115–141
Copyright ©2026. The American Association of Petroleum Geologists. All rights reserved.

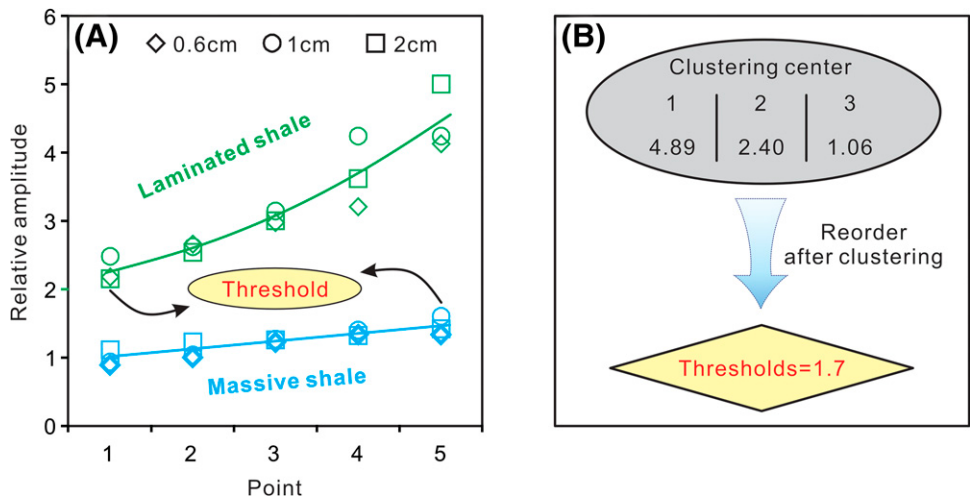


Figure S1. Determination of relative amplitude threshold. (A) Relative amplitude distribution characteristics of laminated and massive shales; rhombus, circles, and squares represent step lengths of 0.6 cm, 1 cm, and 2 cm, respectively. The average of all relative amplitudes within the step length is used as the relative amplitude of a point. The samples selected are representative: from poorly developed laminae (massive structure) to well-developed laminae. (B) Cluster analysis of relative amplitude data sequence; the results of the cluster analysis should be constrained by the data in (A) until the cluster analysis results are within a reasonable threshold range.

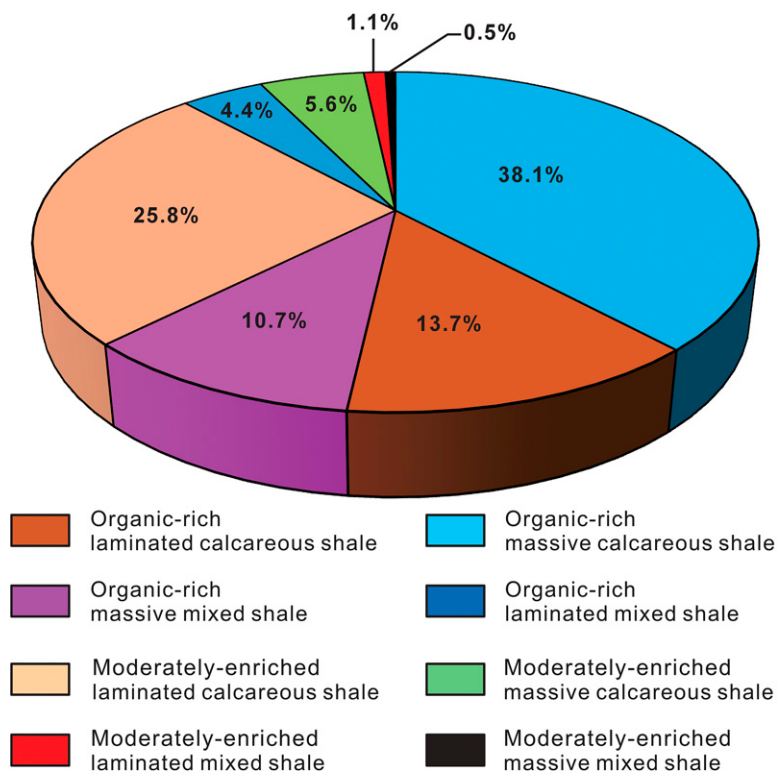


Figure S2. The proportion of each lithofacies of the lower third member of the Eocene Shahejie Formation shale in well A. In the above eight lithofacies, organic-rich massive calcareous shale, organic-rich massive mixed shale, organic-rich laminated calcareous shale, and moderately enriched laminated calcareous shale dominate.

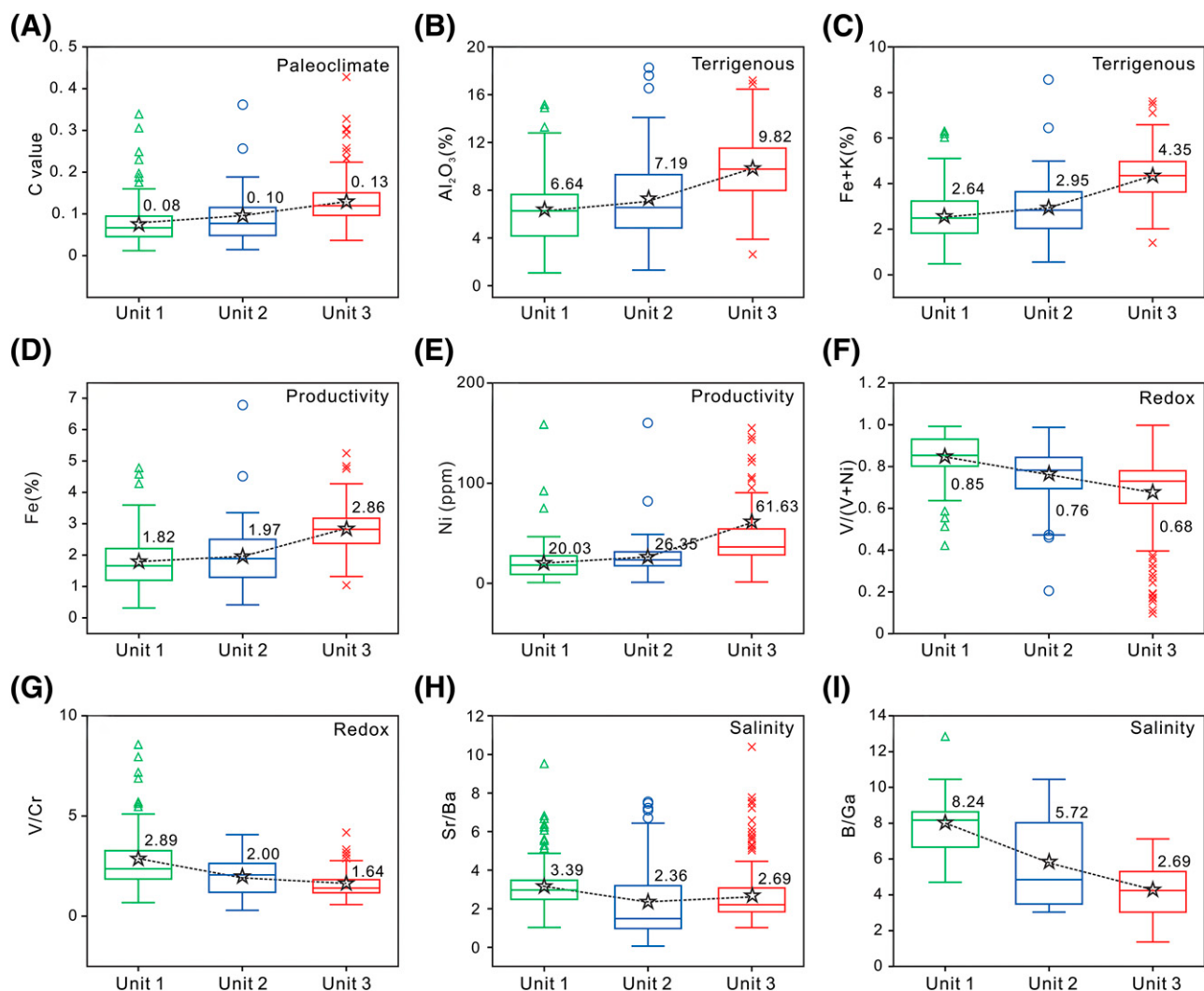


Figure S3. Paleoclimate and paleoenvironmental indicators of different units in the lower third member of the Eocene Shahejie Formation. From unit 1 to unit 3, the paleoclimate shifted from arid to relatively humid, resulting in enhanced continental weathering, increased terrigenous input, and elevated lake productivity, while reducing conditions and salinity decreased. (A) Paleoclimatic proxies for different units. (B, C) Terrigenous input indicators for different units. (D, E) Productivity proxies for different units. (F, G) Redox condition indicators for different units. (H, I) Salinity indicators for different units. Mean values are marked with five-pointed stars.

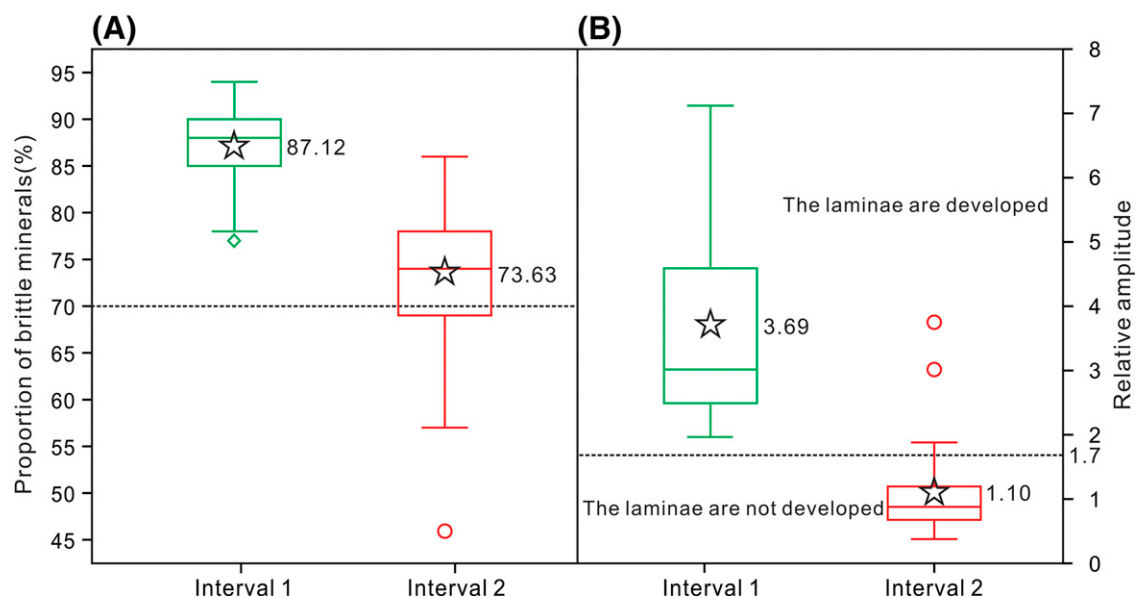


Figure S4. Brittleness evaluation of two oil-rich shale intervals. (A) The brittle mineral content in both intervals exceeds 70%, indicating that they both exhibit high brittleness. (B) Interval 1 shale exhibits exceptionally well-developed laminae, whereas interval 2 shale shows poorly developed laminae. Black numbers represent average values. Interval 1 belongs to unit 1, and interval 2 belongs to unit 3. Mean values are marked with five-pointed stars.